# Soil and terrain modeling to develop medium to small scale conceptual soil maps

Bock, M ; Köthe, R ; Schuler, U ; Günther, A ; Pickert, E ; Willer, J ; Baritz, R ; Zawadzka, J ; Mayr, T ; Mulder, V L ; Moussadek, R ; van Engelen, V

Geophysical Research Abstracts
Vol. 14, EGU2012-13025-1, 2012
EGU General Assembly 2012


# Soil and terrain modeling to develop medium to small scale conceptual soil maps

M. Bock (1,2), R, Köthe (2), U. Schuler (1), A. Günther (1), E. Pickert (3), J. Willer (1), R. Baritz (1), J. Zawadzka (4), T. Mayr (4), V. L. Mulder (5), R. Moussadek (6), and V. van Engelen (7)

(1) Federal Institute for Geosciences and Natural Resources (BGR), Hannover, Germany, (2) scilands GmbH – scientific landscapes, Göttingen, Germany, (3) Saxon State Office for Environment, Agriculture and Geology, Freiberg, Germany, (4) National Soil Resources Institute, Cranfield University, UK, (5) Laboratory for Geo-information Science and Remote Sensing– Wageningen University, Netherlands, (6) Institut National de la Recherche Agronomique du Maroc, Morocco, (7) ISRIC International Soil Reference and Information Centre, Wageningen, Netherlands

In 1995 the SOTER database was launched as an approach to develop landscape maps which can be interpreted for soil management. The delineations were based on a manual evaluation of certain landform properties, adding of interpreted geological entities and attributing the resulting polygons with soil information mostly from one single reference profile. The method had certain shortcomings regarding the subjectivity of the boundaries, the ambiguity of the parent material classification and the scarcity of the soil information. To overcome some of these limitations a revised method for the generation of soil conceptual maps for medium to small scale view has been developed within the EU FP7 project e-SOTER (GA 211578). Here we introduce a new methodology to provide data to support planning and modeling applications, especially in areas whose data equipment is still inadequate, and where new campaigns to raise soil data in the field are not coming into question because of financial and time constraints. The method works with globally available data sets as input, to be applicable - with appropriate adjustments - all around the planet. For mapping soil resources, the soil forming factor relief in form of landform units (similar to SOTER) from modern and purpose-adapted classifications derived from Digital Terrain Model (DTM), e.g. SRTM-DTM, is used. Initially complex and combined terrain parameters like Topograhic Classification Index for lowlands (TCIlow) are derived from DTM. On the base of these terrain parameters the relief is classified into morphometric homogenous landform units with similar terrain forming processes. The classification system of landform units comprises bottom areas, flattenings, slopes and summit areas as top level units. These are further subdivided later. The characteristic of this landform classification is to abandon globally effective thresholds as outlined in the original SOTER approach and to use locally self-adjusting thresholds (local "breaks") to define the boundaries of the landform units. Based on a revised FAO parent material classification, a parent material layer was generated by reclassification of geological maps. The consolidation degree and geochemical character of the stratigraphic units are emphasized over the genesis or geological age. Via combination of relief and parent material information the so-called terrain units (similar to SOTER) are created. Herewith two major factors controlling the soil-forming processes - relief and parent material – are recorded spatially. To complement the obtained digital polygon data with additional pedological information, existing soil data were analyzed. Using this data, a so-called soil component (similar to SOTER) was developed, so that the soil information could be assigned to the delineations acquired before. This was performed for an area with high density of point data (Chemnitz pilot at the border of Germany and the Czech Republic, approximately 14,000 drilling points) and, alternatively, for an area with poor data equipment (two small-scale soil maps in the Morocco pilot). Beside some limitations the results show a plausible picture of the spatial distribution of soil types. Results of a validation exercise are presented as well.